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ABSTRACT

A study was conducted to determine if providing additional time to complete classroom tests increases the test scores of college students with learning disabilities. Whether the accommodation allows the extra time necessary for students with learning disabilities to process the information, leveling the playing field, or whether it creates a comparative disadvantage for students without learning disabilities was explored with 32 students with learning disabilities and 89 without, all enrolled in 6 classes at a private college in Florida. Four nonstandardized multiple choice tests were administered to all participants over a semester. The first two tests were given without any accommodation, while the third and fourth tests were given with additional time for all students. Providing extended time on the test benefited all students, but this accommodation specifically contributed to an increase in scores for learning disabled students, to the extent that their scores increased to the level of nondisabled students who were tested routinely. This accommodation did level the playing field for the learning disabled. Issues for further research include those of self- selection of accommodation by students, kind of learning disability, and type of test. (Contains 5 tables and 24 references.) (SLD)

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LEVELING THE PLAYING FIELD: A COMPARISON OF SCORES OF COLLEGE STUDENTS WITH AND WITHOUT LEARNING DISABILITIES ON CLASSROOM TESTS

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Alterations in course examinations are included as academic adjustments and reasonable accommodations in specific statutes which protect against discrimination (Rehabilitation Act of 1973, 706 (7)(B); Americans with Disabilities Act, P.L. 101-3336). Reasonable accommodations and college level academic adjustments under Section 504 regulations include: changes in the length of time for degree completion, course substitution, and adaptation of the manner in which specific courses are conducted.

The intent of the law clarifies that colleges must provide methods testing the student's achievement rather than reflecting the impairment (Rothstein, 1993). Regulations do not stipulate the alteration of standards, but the balancing of judgment as to what are reasonable accommodations and what policy can combine the variables necessary for fairness in testing practices.

The legislation of the 1970s and 1980s has mandated services to postsecondary students with learning disabilities. According to the US Department of Education (1987), 10.5% of all postsecondary students in the U.S. are disabled. Of this number, 12.2% report having a learning disability. Students with learning disabilities are among the fastest growing population of students with disabilities (Shaw & Norlander, 1986; Vogel, 1993).

Due to the number of students entering colleges and the need for appropriate services, empirical data need to be gathered that expand the research about testing accommodations and the resulting performance on classroom tests of college students with learning disabilities. It is important that the kind of services and accommodations provided establish and support equal opportunity and ethical policy.

The purpose of this study was to determine if providing additional time to complete classroom tests increases the test scores of college students with learning disabilities. Specifically, does the accommodation of extra time benefit students with learning disabilities to a greater extent than it benefits their peers without learning disabilities? If so, does this accommodation provide the additional time needed by students with learning disabilities to process information and therefore, "level the playing field"; or does it create a comparative disadvantage for students without learning disabilities?

According to Vogel and Adelman (1993) and Casey (1987) the use of extended time to complete tests is the most frequently requested accommodation with postsecondary students. Previous research on this accommodation has been limited to standardized tests not administered in classroom settings (Centra, 1986; Munger and Lloyd, 1991; Wild and Durso, 1979).

Three recent studies have investigated the extension of time on standardized tests for postsecondary students with learning disabilities (Runyan, 1991a, 1991b; Weaver, 1993). These studies were conducted with subjects individually or in small groups on a standardized reading test. The results indicate that extra time on a specific test enables all students to demonstrate higher achievement than under routine timed conditions. The students with learning disabilities in these studies achieved greater gains than the students without learning disabilities. The precise reasons for this appear to suggest a slower rate of processing.

In the classroom content areas, no recent study has examined time extension for postsecondary students with learning disabilities. Comparing the performance of students with and without disabilities has been problematic due to the difficulty of finding enough numbers of students with disabilities per institution to provide valid data (Scott, 1990).

Another problem has been in comparing norms on standardized tests that have been administered under different conditions, such as extended time provided, on a test that is normed for speed. Test developers establish a limit within which 75% to 90% of those taking the test can finish (Sherman and Robinson, 1982) and differences in speed and power tests may differentially affect the performance of groups of test takers (Donlon, 1980). If power tests are more speeded for those without disabilities then is it reasonable to set extra time limits for those with disabilities? Even with the extra time the test is still speeded and may not reflect the true performance.

Presumably, there are students without learning disabilities who may have a slower rate of comprehension (Zabrucky and Commander, 1993). These students may benefit from additional time on classroom tests, yet this option may not be available. Wild and Durso (1979) studied the effects of increased time on experimental sections of the GRE for students without disabilities. They found that providing an additional 20-30 minutes of time to complete these subtests resulted in a small but significantly increased score.

The primary question addressed by this study was whether providing additional time to college students with learning disabilities increased their scores on classroom tests to the level of the scores achieved by their peers without learning disabilities.

To attempt to answer this question, three hypotheses were tested. The first was that the test scores received by students with learning disabilities under the extended time condition would be comparable to the scores received by the students without learning disabilities under the routine time condition.

The second hypothesis was that the students with learning disabilities would achieve higher scores on classroom tests when given extended time to complete the tests.

The third hypothesis was that the test scores of students without learning disabilities would not increase significantly when they took additional time.

Method

Subjects

The participants in this study were students at a 4 year private college in South Florida. All were enrolled in one of the six classes considered in this study. To avoid duplication of subjects' responses no student was in more than one class. The classrooms were selected based on convenience sampling and were in the business and hospitality management schools. The average class size was 35 and the classes selected had approximately seven students with learning disabilities in each one of the six classes.

One hundred and twenty-one college students, ages 19 to 23 years were involved in the study. Thirty- two were students with learning disabilities and eighty-nine had no diagnosed learning disability. All students identified as having a learning disability had recent (within three years) diagnostic testing that indicated the presence of a learning disability. The students without learning disabilities have no known or disclosed learning disabilities.

To control for the effects of participant bias all subjects served as both the experimental and control group and came from the population of college students enrolled at the university.

Instruments

Four non-standardized tests which were routinely used by two instructors were administered to all participants over a semester in six classes. The classes included:

Organizational Behavior; Principles of Marketing; Small Business Management; and Introduction to Hospitality Management. One instructor taught the three business courses and one taught the three sections of hospitality. The tests were either multiple-choice or short answer and test scores scaled with a maximum score of 100 points for each test. Each test was scored by percent correct. The tests in business and in hospitality had 50 items on each test.

Procedures

All of the tests were administered in the classroom settings by the instructor and taken by all subjects in the study. Counterbalancing for order effects was not necessary because the initial baseline testing was not an experimental condition.

The first two tests in all six classes were given under the routine testing time of 50 minutes. Data were collected at this phase, but no adjustments to the typical classroom testing situations were made. During this baseline phase no special instructions were given. The tests were administered and graded by the instructor and the grades recorded.

Baseline data were established during the first test given in each of the six classes. This provided an assessment of each student's test score under typical classroom time conditions of 50 minutes and provided a baseline score as an assessment of prior learning. The third and fourth tests were given with additional time made available to all students to complete the test if needed. At the beginning of the third test, the treatment phase, all students were told by their instructors that they should finish the test and take additional time if necessary. As each student turned in her/his test the instructors wrote the time the test was completed on the test. Any students with learning disabilities that usually took their tests outside of the classroom in the LD support services office continued this practice. Their scores were recorded separately and not used for the purpose of this study.

Test scores were collected on both the baseline and the treatment phase of the study, thus providing a comparison between scores received under timed and additional time conditions for all students in the six classes. The timed and untimed scores of all students were collected on all tests. This provided not only the actual amount of additional time required but also provided data on the scores obtained under both conditions by students with and without learning disabilities.

Results

The first assessment was to determine achievement levels of LD and NLD students under both timing conditions. Are the scores of the NLD students higher than the scores of the LD students?

Table 1 presents the test scores for LD and NLD students. The option of extended time was available on tests 3 and 4 to all students. The mean scores in Table 1 include all scores achieved by LD and NLD students regardless of the timing condition under which they completed the tests. A two - way repeated measures ANOVA indicated that there was a significant difference in the overall mean scores of NLD and LD students, $F(1,119) = 9.70$, $p = .002$. The NLD students in this study achieved higher overall scores than the LD students.

Table 1

Means by Student Type

	NLD n=89		LD n=32					
	M	S	M	S	Σ	S	F	Significance
Test 1	80.54	13.15	71.47	15.92	78.14	14.43		
Test 2	78.37	13.16	73.00	11.84	76.95	12.99		
Test 3	78.27	12.17	73.63	12.22	77.04	12.30		
Test 4	81.13	12.01	76.53	11.42	79.90	11.98		
Σ	79.57	12.62	73.66	12.85	76.62	12.74	9.70 (1, 119)	0.002

The playing field does not appear to be level. Does the extended time make a difference in the test scores? When students take the option of extended time do their scores improve?

The test scores for the NLD students are shown in Table 2. The repeated measures ANOVA showed that while there was not a significant difference between the overall mean scores by timing condition, $F = (1, 87) = .78$, $p = .381$, there was a significant interaction effect between timing condition by tests, $F(3, 261) = 16.51$, $p = .000$.

Table 2

Differences in Mean Scores by Timing Conditions for NLD Students

	Extended Time NLD n=37		Routine Time NLD n=52				F-ratio obtained by Neuman-Keuls	
	M	SD	M	S	M	S	F(df)	Significance
Test 1	77.78	12.26	82.50	13.50	80.54	13.15	2.83 (1,87)	0.091
Test 2	74.41	12.74	80.48	13.16	78.37	13.55	3.30	0.070
Test 3	84.24	9.09	74.02	12.36	78.27	12.17	18.25	0.000
Test 4	85.05	8.35	78.35	13.40	81.13	12.01	7.22	0.009
Σ n=89	80.62	10.61	78.83	13.11	79.72	11.85	0.78 (1, 87)	0.38

It appears that the mean scores for the NLD students on tests 1 and 2 were not significantly different. These tests were taken as pretests (routine time) with no intervention. On tests 3 and 4, which 52 NLD students took with routine time and which 37 NLD students took with extended time, there was a significant difference in the mean scores by timing condition. The scores on tests 3 and 4 for the NLD students were higher. Test scores of the NLD students in this study showed a significant increase with the extended time.

It has been established that the overall scores of the NLD students are higher than the scores of the LD students, and that the NLD students' scores improved with the intervention of extended time.

The next question was did the students with learning disabilities achieve higher scores on classroom tests under extended time conditions when compared to the scores that they received under the routine time condition? Table 3 shows the mean scores for both timing conditions. The overall mean score appears to be comparable between the routine and extended time conditions for the LD students.

Table 3
Differences in Mean Scores by Timing Conditions for LD Students

	Extended Time LD n=13		Routine Time LD n=19					
	M	S	M	S	M	S	F	Significance
Test 1	67.23	19.20	74.37	13.01	71.50	15.90		
Test 2	73.39	10.59	72.74	12.91	73.84	11.69		
Test 3	74.15	13.50	73.27	11.63	73.63	12.22		
Test 4	79.92	13.60	74.21	9.31	76.53	11.42		
Σ n=32	73.673	14.23	73.645	11.71	73.659	12.97	0.00 (1, 30)	0.993

To determine if there was a significant difference between the mean scores of the LD students under the two testing conditions, a repeated measures ANOVA was used. When the mean scores were analyzed, the overall differences between the extended time condition and the routine time condition were not statistically significant, $F(1,30) = .00$, $p = .99$. There was also no significant interaction in timing condition by test, $F(3, 90) = 1.81$, $p = .151$.

This does not mean that the test scores of the LD students were unaffected by the timing condition. It shows that when the test scores of the LD students were averaged over all four tests, the overall means between extended time and routine time were not significantly different from each other. The presence of the low score on test 1, which was not taken with extended time, contributed to the overall mean score for the extended time group.

To attempt to clarify this puzzling result, it may be helpful to compare the differences in the aggregate mean scores on Tests 1 and 2 with the aggregate mean scores on Tests 3 and 4 by timing condition. These means are presented in Table 4.

Table 4
Differences in Aggregate Scores on Tests 1 & 2 and
Aggregate Scores on Tests 3 & 4 by Timing Condition for LD Students

	Extended Time LD n=13		Routine Time LD n=19	
Tests	M	SD	M	SD
1&2	70.31	12.70	73.50	12.95
3&4	77.03	12.25	73.75	10.47

From observation, it appears that with the routine time condition the aggregate scores are not different between Tests 1 and 2, (pretest) and Tests 3 and 4, (posttest). In comparison, with the extended time condition, the scores on Tests 1 and 2 appear lower than the scores for Tests 3 and 4.

A repeated measures ANOVA will determine the significance of the interaction, $F = 2.10$ $(1,30)$, $p = .158$. These results are shown in Table 4 and do not demonstrate a significant interaction. With the F greater than 2, it may be there is a difference in scores between the two timing conditions and that the small sample size (n=32) is affecting the result. Nevertheless, this cannot be supported statistically.

The prior analyses confirmed that there was a difference in overall scores between LD and NLD students. The achievement levels of the NLD students were higher than the achievement levels of the LD students, and the playing field is not level. The option of extended time benefitted the NLD students, and while this treatment also appeared to help LD students, statistically there is no difference in the LD scores between the routine and extended time

conditions.

Further investigation is necessary to determine whether with extended time the test scores of the LD students increase to the level of the scores achieved by the NLD students.

In Table 5 the test scores of the LD students, who took extended time are compared to the test scores of the NLD students, who took routine time.

Table 5
Differences in Mean Scores by Timing Condition for LD and NLD Students

	Extended Time LD n=13		Routine Time NLD n=52				F-ratio obtained by Neuman-Keuls	
	M	SD	M	S	M	S	F(df)	Significance
Test 1	67.23	19.20	82.50	13.52	79.45	15.89	11.1 (1,63)	0.001
Test 2	73.39	10.59	80.48	13.16	79.06	12.92	3.242	0.016
Test 3	74.15	13.50	74.02	12.36	74.05	12.49	0.0012	0.97
Test 4	79.92	13.60	78.35	13.40	78.66	13.39	0.1424	0.71
Σ	80.62	10.61	78.83	13.115	79.7	11.86	2.88	0.095

n=65

The two -way repeated measures ANOVA shows that there is an interaction between treatment and student type, $F(1, 63) = 2.88$, $p = .095$. The results of the Neuman - Keuls demonstrate that there were differences between the scores of LD/NLD students on test 1, $F(1,63) = 11.112$, $p = .001$ and test 2, $F(1,63) = 3.342$, $p = .03$, which were given under the routine condition. No significant differences were shown between test 3, $F(1,63) = .0012$, $p = .97$ and test 4, $F(1,63) = .1424$, $p = .7$, which were given under the extended time condition.

The treatment of extended time to complete tests for students with LD did appear to "level the playing field" for the students in this study. With this treatment their test scores were statistically equivalent to the level of the students without LD who took the same tests under the routine time testing conditions.

Discussion

The primary purpose of this research was to assess the benefits of providing extended time on tests in college classrooms. Previous research in this area with LD and NLD students was not collected in classroom settings and therefore, the findings were difficult to generalize to the classroom environment. Providing the option of extended time on classroom tests benefitted all students in this study, those with and without learning disabilities. However, this accommodation specifically contributed to an increase in the test scores of the LD students, to the extent that their scores increased to the level of the scores of the NLD students who were tested routinely. Without the extended time option the overall scores of the LD students were lower than the scores of the NLD students. In other words, this accommodation "levels the playing field" for LD students.

Of particular interest to this research was whether the accommodation of extended time brought the level of scores of the LD students up to the level of scores of the NLD students who took the same tests under routine time conditions. If the LD students come to the testing situation with specific, documented deficits in processing and comprehension that are not shared by their peers without LD, then the accommodation of providing additional time does seem to equalize the testing situation and allow the LD students to demonstrate their knowledge.

Research has shown that specific deficit patterns affect testing performance for students with learning disabilities. These patterns include a slower rate of processing, a lowered level of comprehension, and a more limited automatic response in using the subskills which underlie academic performance (Bell and Perfetti, 1994; Hayes, Hynd, and Wisenbaker, 1986; Vogel, 1986). This finding is consistent with Weaver's (1993) and Runyan's (1991a.,b.) data which demonstrated that additional time on a specific reading test enabled LD students to achieve

significant gains in scores.

The earlier research of Bruck, (1990); Bos and Filip, (1984); Vogel, Hruby, and Adelman (1993), demonstrated that LD students often relied on contextual cues inefficiently, and when their reading rate increased their comprehension scores went down. It appears that students with learning disabilities who have difficulty in the decoding processes of reading demonstrate slower reading speed. Thus, less time is available to comprehend test questions and strategize answers.

Students who are more skilled readers have larger vocabularies, and since they read more quickly, they read more often and employ a variety of automatic comprehension strategies (Stanovich, 1988; Torgeson and Dice, 1980).

It follows that if students with learning disabilities are given more time in which to process written information and reread for additional cues, their achievement levels when taking classroom tests would increase.

In this study, the students without learning disabilities benefitted from the extended time. Their overall test scores increased as did their scores on the individual tests. This finding raises two issues. First, taking additional time improved the test scores for NLD students. Yet, classroom tests are routinely administered with a time limit. Perhaps, the NLD students scores are an accurate assessment of their achievement with the time limit, but in this study those who selected the extra time showed an increase in test scores. It appears that the NLD students who selected the extended time had lower scores on tests 1 and 2 than the NLD students who did not select the extended time. Perhaps the extended time students were less prepared and assumed that the extra time might help increase their scores, or they could have been students with learning disabilities who chose not to disclose the information or were undiagnosed.

The tests in this study were designed as power tests, yet they imposed a time limit. It

appears that with the time limit imposed the tests become speeded tests for all students, with and without learning disabilities. Speed tests are designed for completion of a certain number of items in a given time. In certain situations, the speed of completion may be a necessary component to the test. However, by imposing time limits on a power test, students are forced to finish a test in a given time. They may or may not be able to spend the time needed to adequately answer each test question.

For LD students, who come to tests with specific diagnosed deficits, tests which are given with time limits appear not to adequately assess their achievement. Tests that are designed as power tests may become speeded if the time limit impinges on the student's processing capabilities.

Furthermore, the results of this study indicate that tests with time limits may also not adequately assess the achievement of students without learning disabilities.

The number of LD students in the study was adequate when compared to the students with NLD (32:89). However, the size of the sample of LD students who selected extended time on both tests was small (13). It was difficult to find classroom settings where there were high proportions of LD students because of the random distribution of students. This study used a repeated measures design which proved difficult for experimental control. The sample was a convenience sample, and not controlled for gender, IQ or ethnicity. The university in the study was in south Florida and for a number of students English may not be their first language.

Given the heterogeneous nature of learning disabilities, the analysis of this group's scores may not represent the larger group of students with LD. Additionally, there are many different diagnoses of learning disabilities (Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD), dyscalculia, dysgraphia, dyslexia, etc.) that affect the processing and

comprehension of information in different ways.

Some LD students exhibit processing problems in math, and their reading skills are not specifically affected. The tests administered in this study were multiple choice and/or short answer and required reading. For students who may be diagnosed with ADD/ADHD, the time element may have nothing to do with reading comprehension, but may be related to concentration.

Some students in the study may have a learning disability and chose not to disclose the information. There may be others with LD who were not identified through the LD program and /or had an undiagnosed learning disability. Other students may be like the students in the Zabrucky and Commander study (1993) that were identified as "poor comprehenders"; their reading comprehension skills and speed may be below average. These students would have been included in the group of NLD students in this study.

Given the sample selection based on convenience, it is difficult to assess its representativeness of the population. Students in college classrooms with and without learning disabilities bring different abilities, interests, levels of preparedness, and expectations to the testing situation. Although the sampling procedure made an attempt to randomize, the treatment was self selected. It may be that the treatment could have benefitted a greater number of students had they chosen.

We can only speculate why students selected extended time. For the LD students the additional time is frequently an option provided. This option may lessen their test anxiety because if they read slowly, they are not rushed to complete all the test items. For the NLD student and the LD student, the selection of additional time may be due to a number of concerns: a low score on a previous test with additional time viewed as a chance to improve; difficulty encountered on an individual test; less preparation for specific tests; or deciding that the extra time cannot

decrease the score, but may help.

It is further speculation as to why students did not select the additional time. The academic schedules of all students in this study enabled them to take the extra time, if they chose. It may be that these students did not feel it would help because they were unprepared, and time was not going to make them more prepared. Perhaps, they knew the answers within the time limit and did not need the additional time, making it a true power test. Personal reasons could have influenced their decision. It could be that they had made plans and were not willing to alter their schedule. Perhaps, they were uncomfortable to appear to need the extra time.

In addition, when told to take additional time to complete a test if necessary, a student may pace herself/himself differently. Therefore, the time may not the issue, as much as the reaction to having more time.

Controlling for the self selection factor in future studies is a primary concern. One way to control for self selection of treatment in future studies would be to design tests that require the maximum time limit for completion.

The order of test presentation did not appear to influence the test scores. A consecutive increase in mean test scores did not occur for the students who took routine time on all tests. The score increases were noted for those taking extended time.

However, teacher effect may have influenced the scores on the tests because of differences in teaching styles between teachers. The instructors involved in this study were selected because in their classes they routinely gave four multiple - choice tests over a semester, had high proportions of LD students were in their classes, and were willing to participate.

Involving only two volunteer instructors makes generalizability difficult. However, investigating this topic over many content areas risks the confounding of teacher and subject

effect, but adds to the generalizability of the intervention.

The use of non standardized, teacher - constructed tests may have affected the results of this study. The tests were not analyzed by item analysis for levels of difficulty, and the tests were not normed. They were designed by the instructors to correspond to the course objectives. mean test scores. All of the tests were predominately multiple - choice, with few items short answer. The multiple - choice format may be more demanding for students with specific kinds of LD. For example, the use of negatively phrased questions may prove difficult for students with specific language disabilities. The visual arrangement of selection items may be confusing to those students with visual processing difficulties.

The implications for future research include the issues of self selection of treatment, kind of learning disability, and type of test. Additional research needs to be conducted that clarifies the academic performance of LD students in college classrooms and examines individual achievement in different content areas. This kind of information would be most helpful if focused on comparisons between types of LD and differences in achievement levels between NLD and LD students. Since accommodations must be determined on an individual basis, comparative studies using matched - pairs of NLD/LD students determined by IQ, gender, achievement levels, and grouped by type of LD would provide more detailed information.

Data need to be generated that ask why some students select the additional time and others do not. Is it because they are unprepared for the tests; are anxious about the testing situation; need more time to comprehend the questions; more time to concentrate; or need the time only for different kinds of tests/subjects?

For faculty, the question of power versus speed tests is an issue. Class tests are frequently teacher constructed and usually given within a fixed time limit. If test scores increase and more

items are answered without the fixed time limit, then with a fixed time limit the test may become speeded, which is not the way the test was designed. Finally, if additional time on tests benefits students, and tests are given with time limits, the tests may not be a true measure of performance.

This study adds to and expands on the previous research about extended time on tests for college students with learning disabilities. The results demonstrated that additional time taken on classroom tests does appear to level the playing field for students with learning disabilities. To further explain how extended time as an accommodation on classroom tests benefits students, future research needs to be conducted that controls for individual difference measures between types of LD, IQ, and gender. This would more precisely define the playing fields and achievement levels of students and clarify to a greater extent the benefits of extended time.

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